

(12) UK Patent Application (19) GB (11) 2 326 050 (13) A

(43) Date of Publication 09.12.1998

(21) Application No 9801728.8

(22) Date of Filing 27.01.1998

(30) Priority Data

(31) 09145407 (32) 03.06.1997 (33) JP

(71) Applicant(s)

Fujitsu Limited
(Incorporated in Japan)
1-1 Kamikodanaka 4-chome, Nakahara-ku,
Kawasaki-shi, Kanagawa 211-8588, Japan

(72) Inventor(s)

Hiroshi Kubo

(74) Agent and/or Address for Service

Haseltine Lake & Co
Imperial House, 15-19 Kingsway, LONDON,
WC2B 6UD, United Kingdom

(51) INT CL⁶

H04B 1/38

(52) UK CL (Edition P)

H4J JK J36Q

(58) Documents Cited

EP 0684723 A2 WO 96/03810 A1 WO 90/13952 A
US 5465401 A US 5331123 A

(58) Field of Search

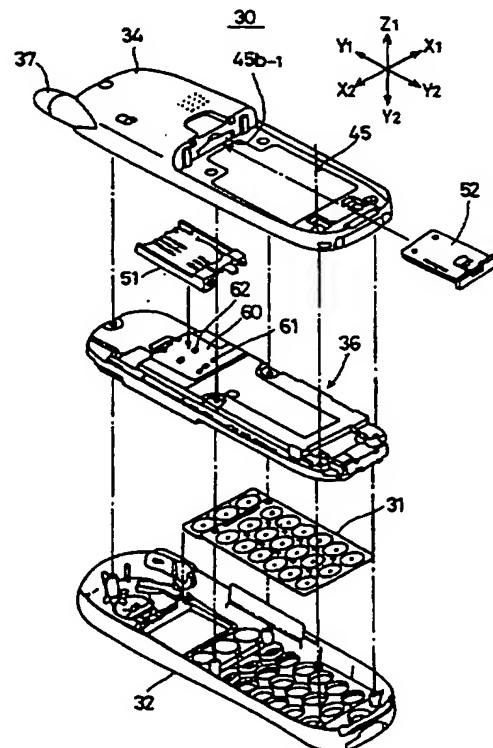
UK CL (Edition P) H4J JK, H4L LECX
INT CL⁶ H04B 1/034 1/08 1/38, H04M 1/02 1/72

(54) Abstract Title

Portable telephone set with a card loading portion and battery housing side by side

(57) A portable telephone set 30 includes a case 32,34 and a card loading mechanism 51,52. The case has first and second sides 32 and 34 opposite to each other. A group of keys 31 is located on the first side of the case. The case includes first and second portions 45 and 45b-1 located on the second side. The first portion 45 can accommodate a battery pack and the second portion is next to the first portion and accommodates the card loading mechanism. A card in which information is stored can be loaded into the card loading mechanism and held by a spring mechanism. Also provided is a detection switch (figures 8 and 15) to detect if the card is present in the card holder. The detection switch has a terminal which is sprung to engage with the card in the card holder.

FIG. 3



GB 2 326 050 A

FIG. 1A PRIOR ART

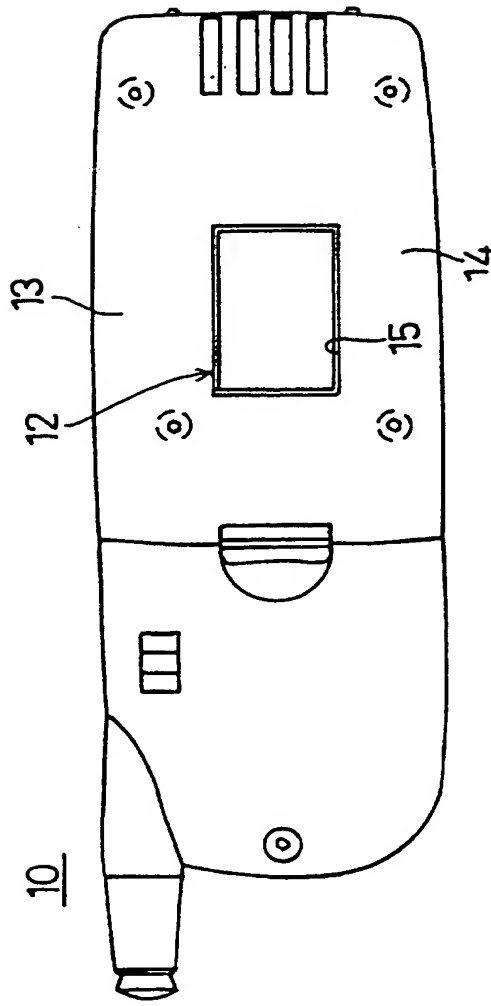


FIG. 1B PRIOR ART

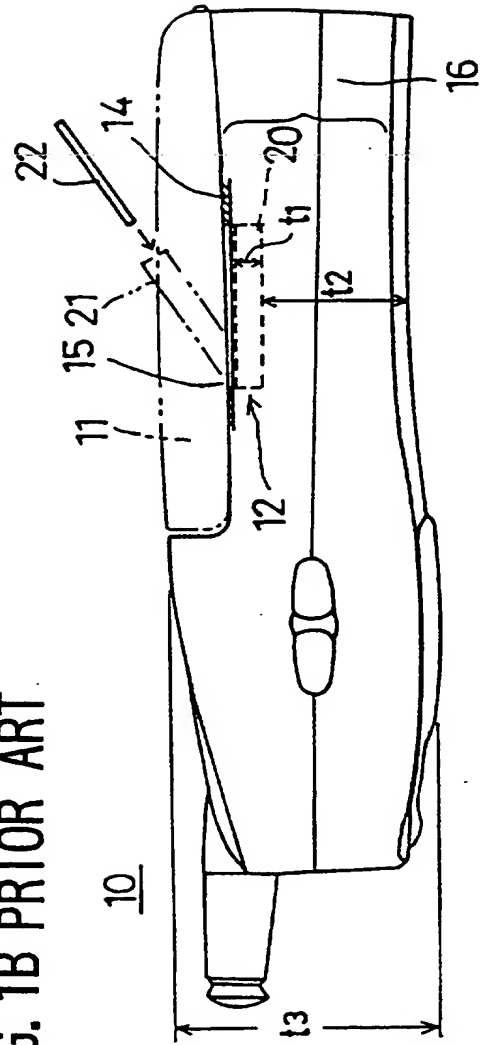


FIG. 2A

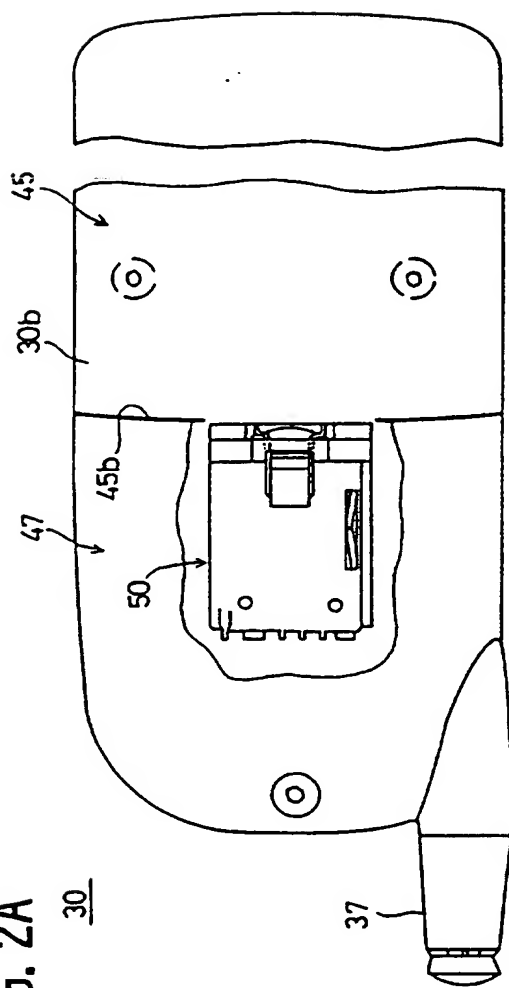


FIG. 2B

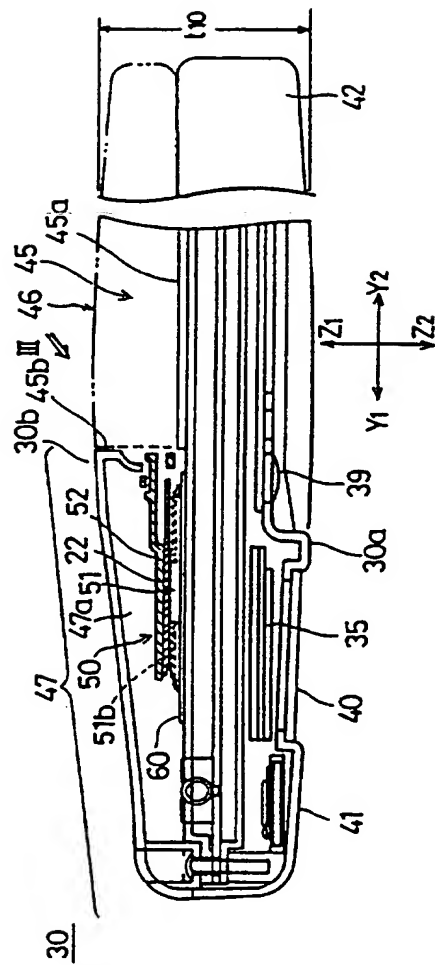


FIG. 3

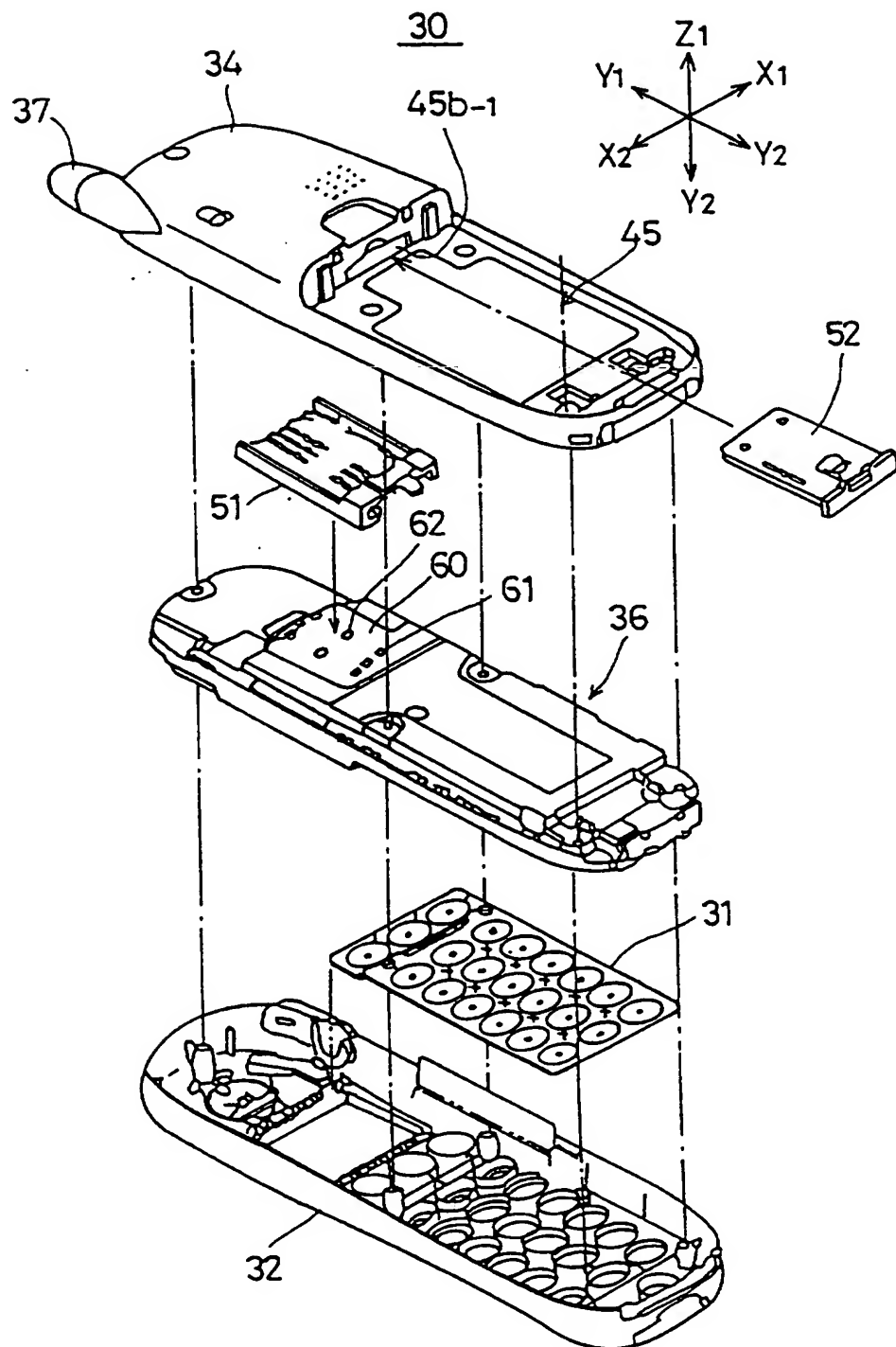


FIG. 4

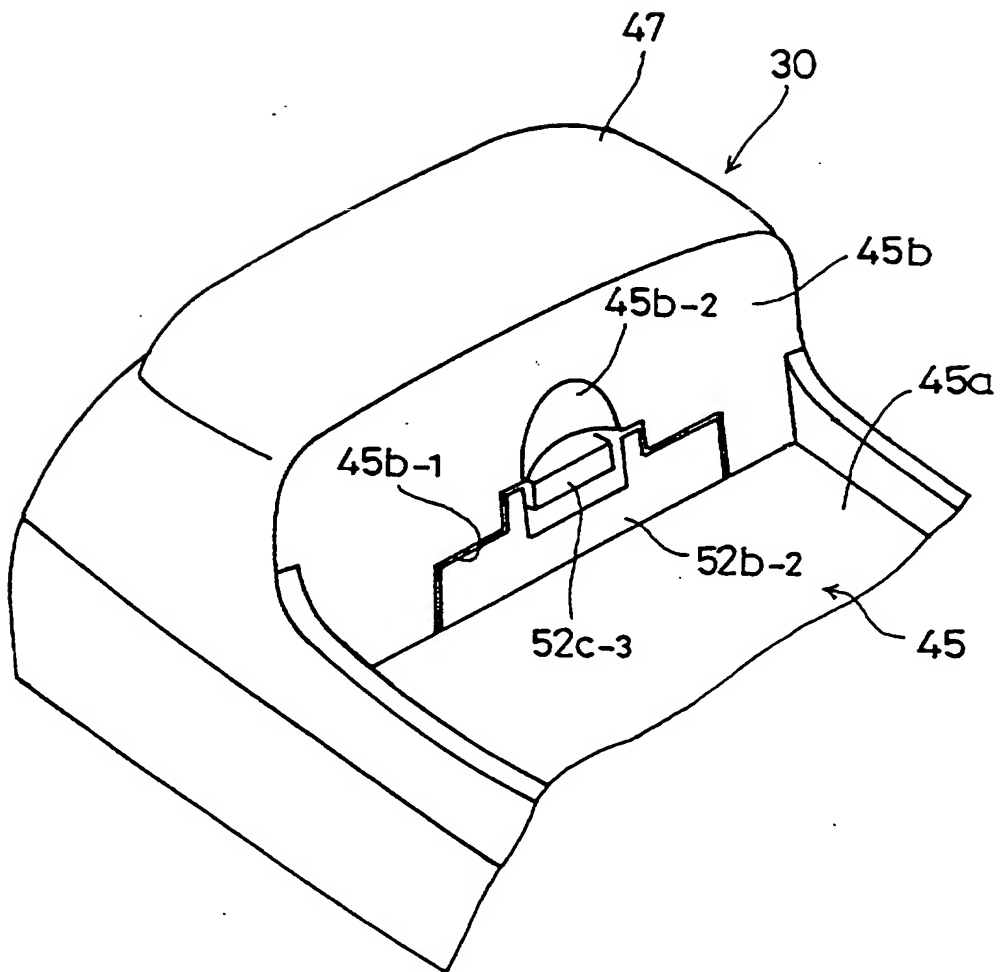


FIG. 6

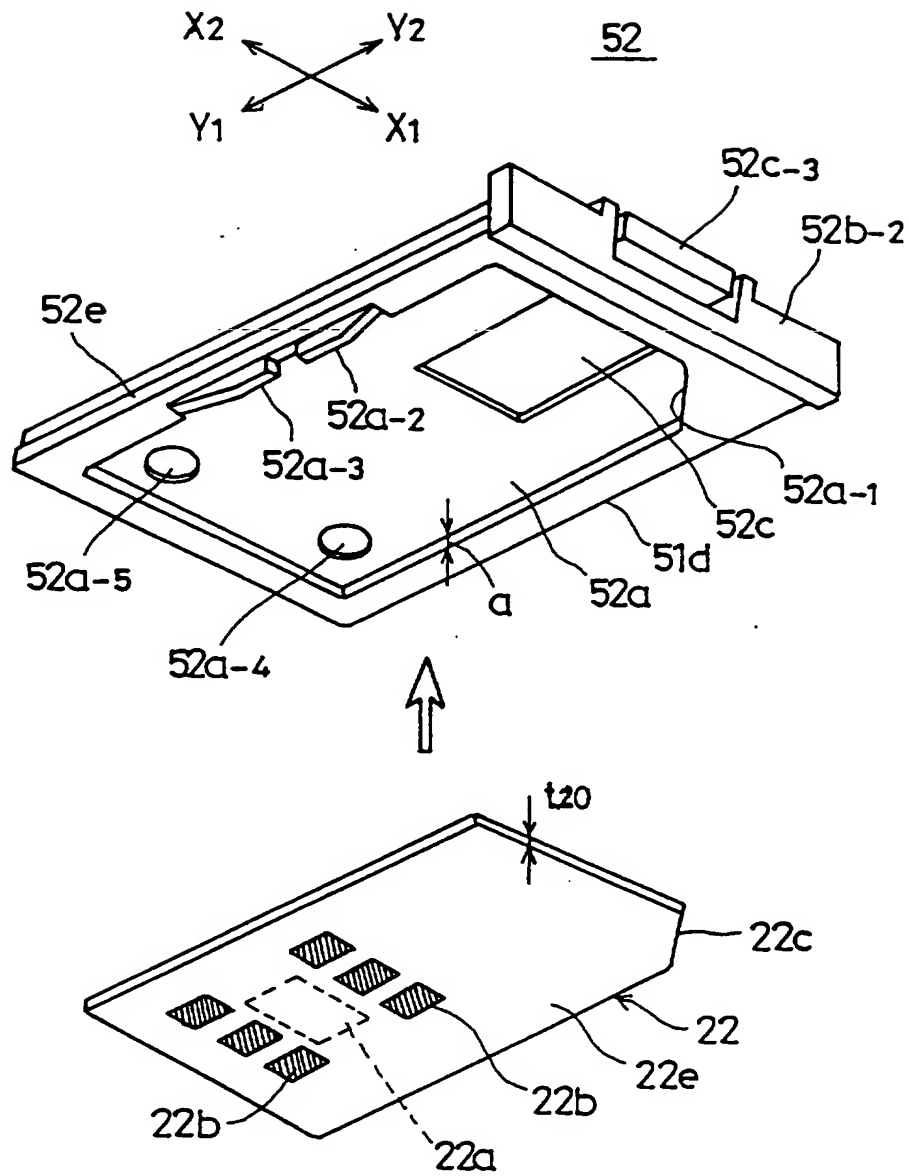


FIG. 7A

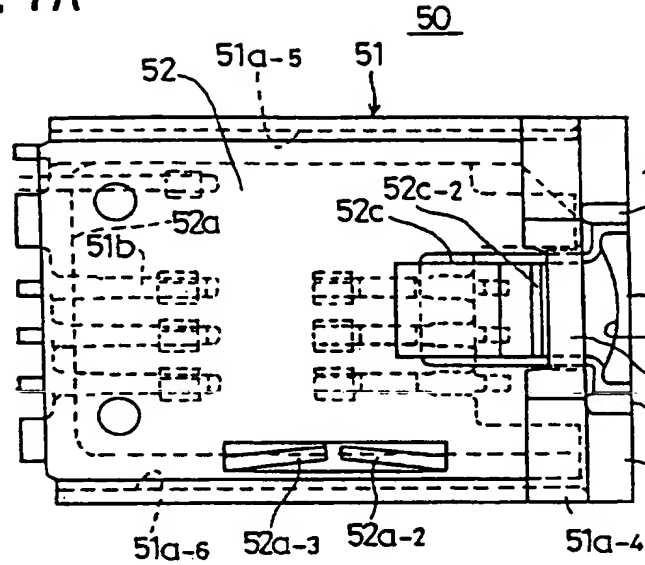


FIG. 7B

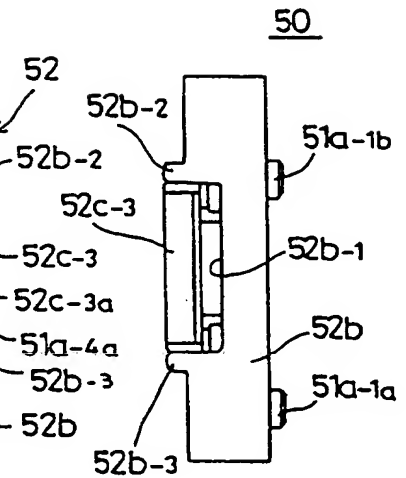


FIG. 7C

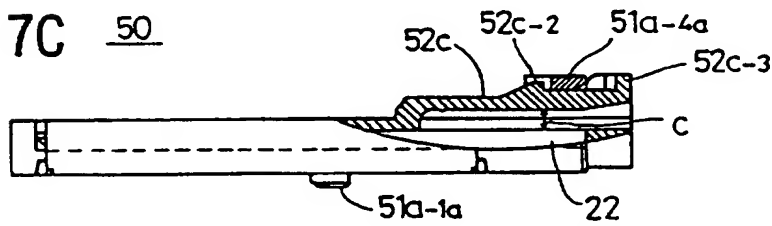


FIG. 7D

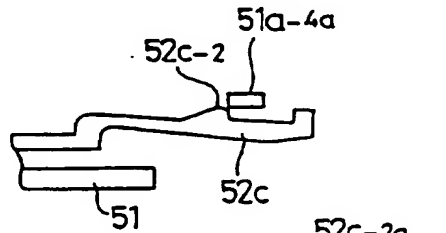


FIG. 7E

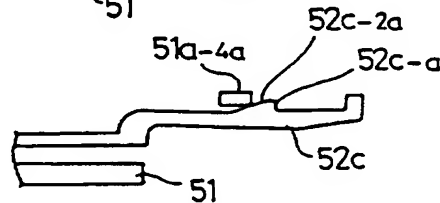


FIG. 8A

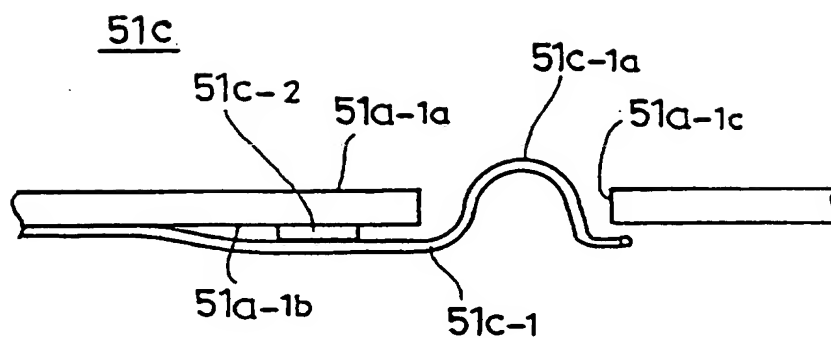
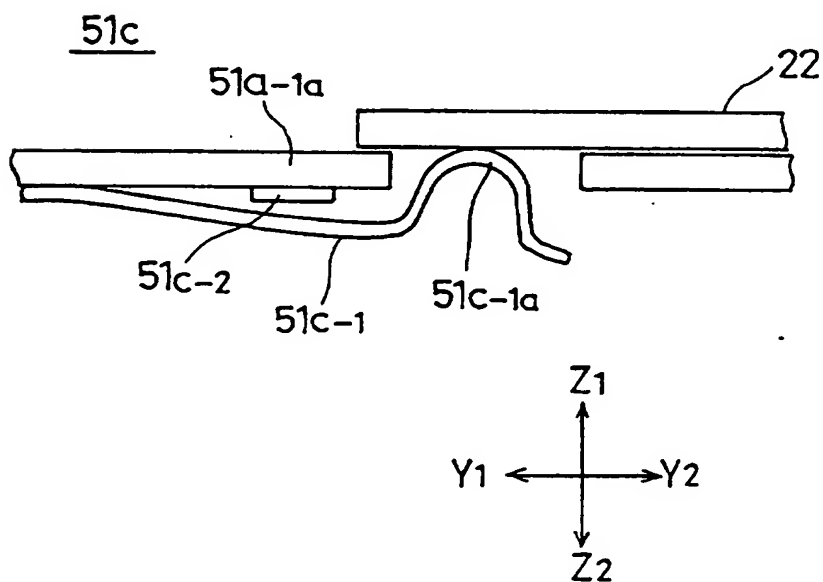
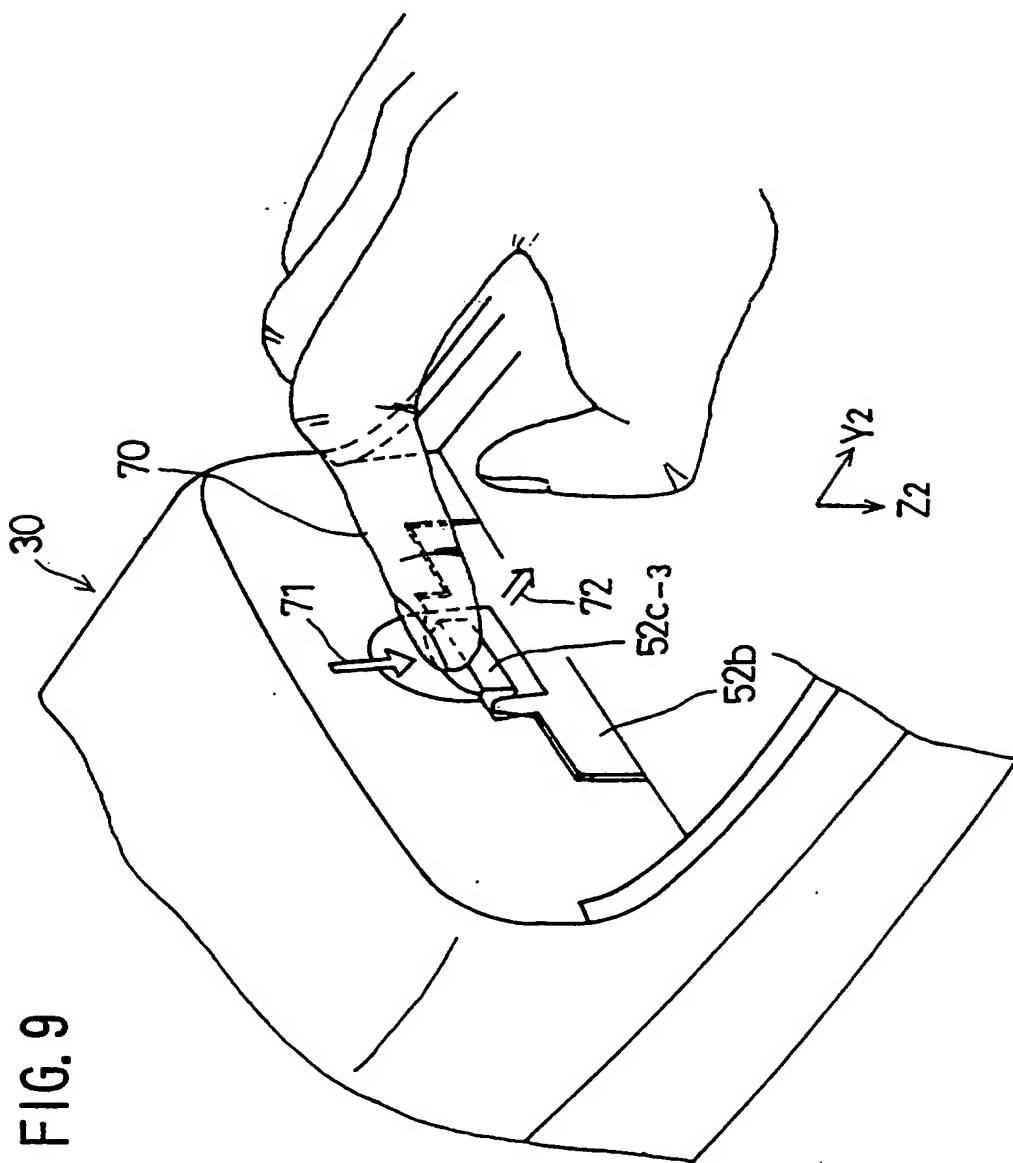


FIG. 8B





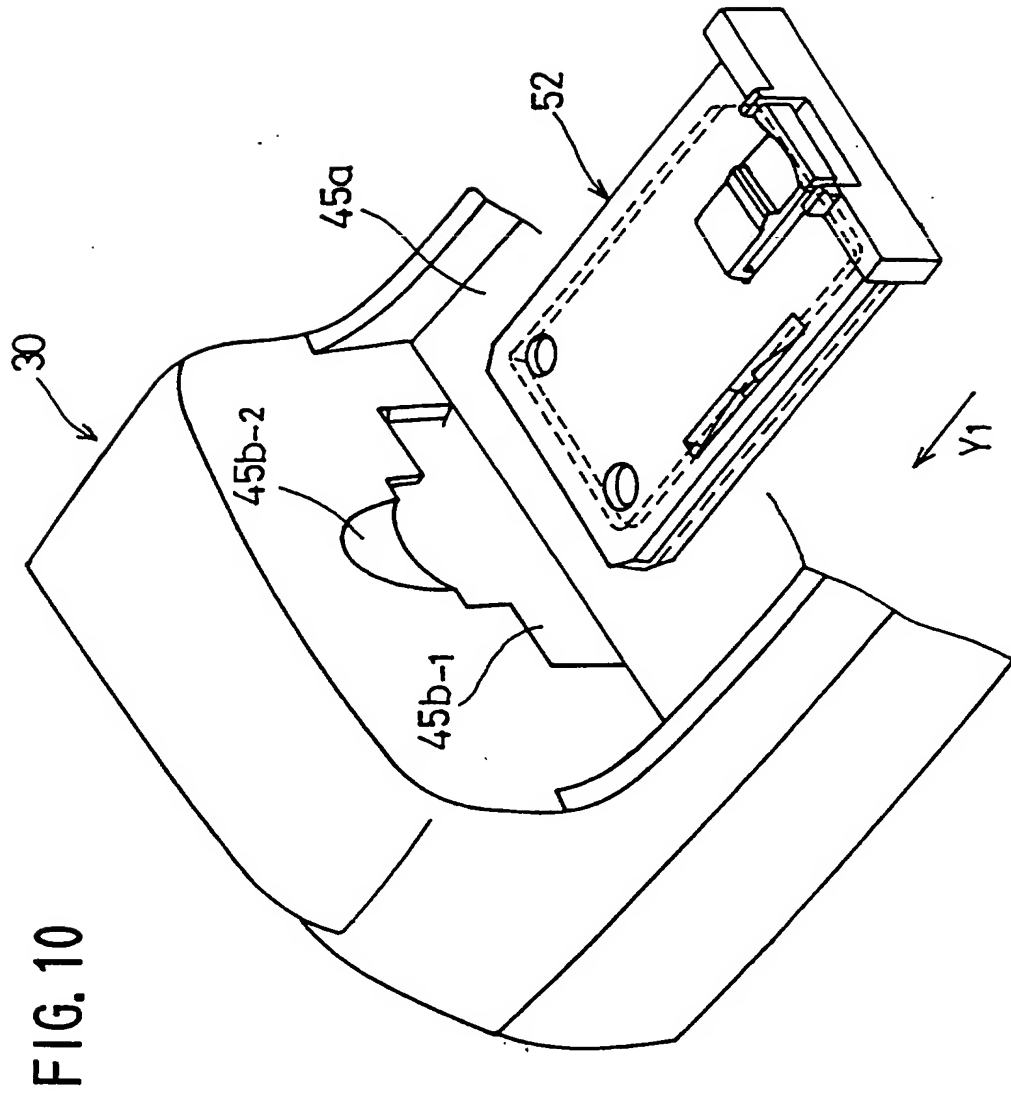


FIG. 11A

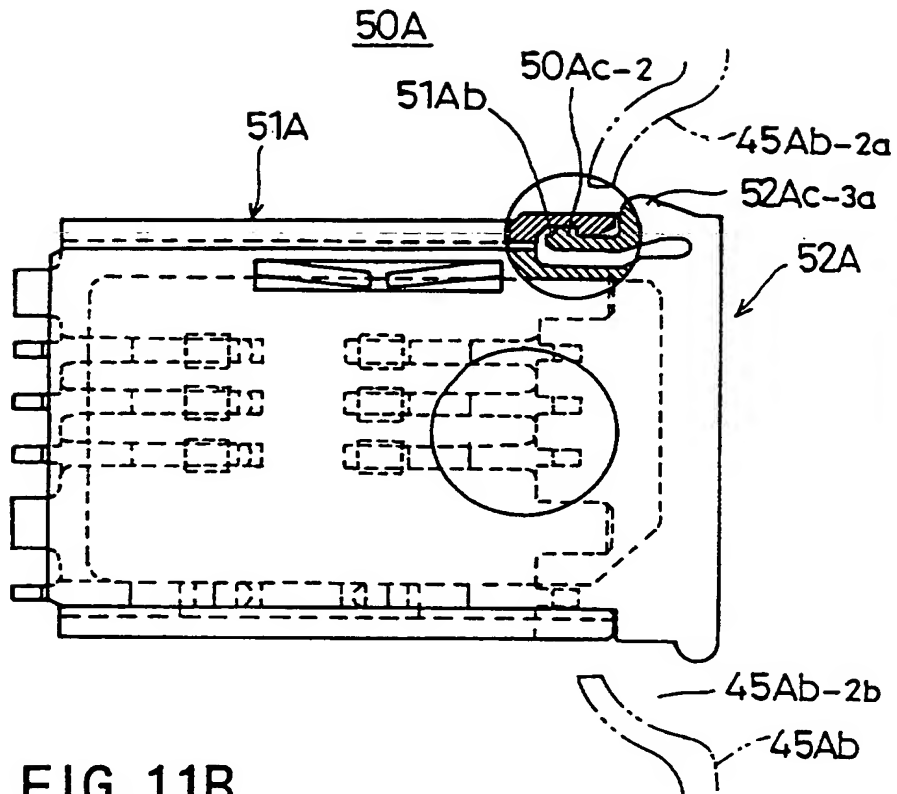


FIG. 11C

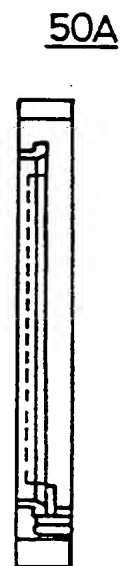


FIG. 11B

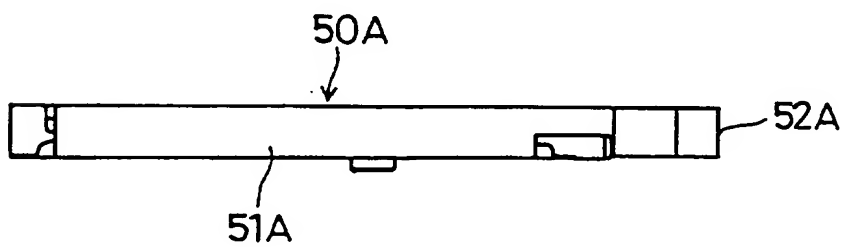


FIG. 12

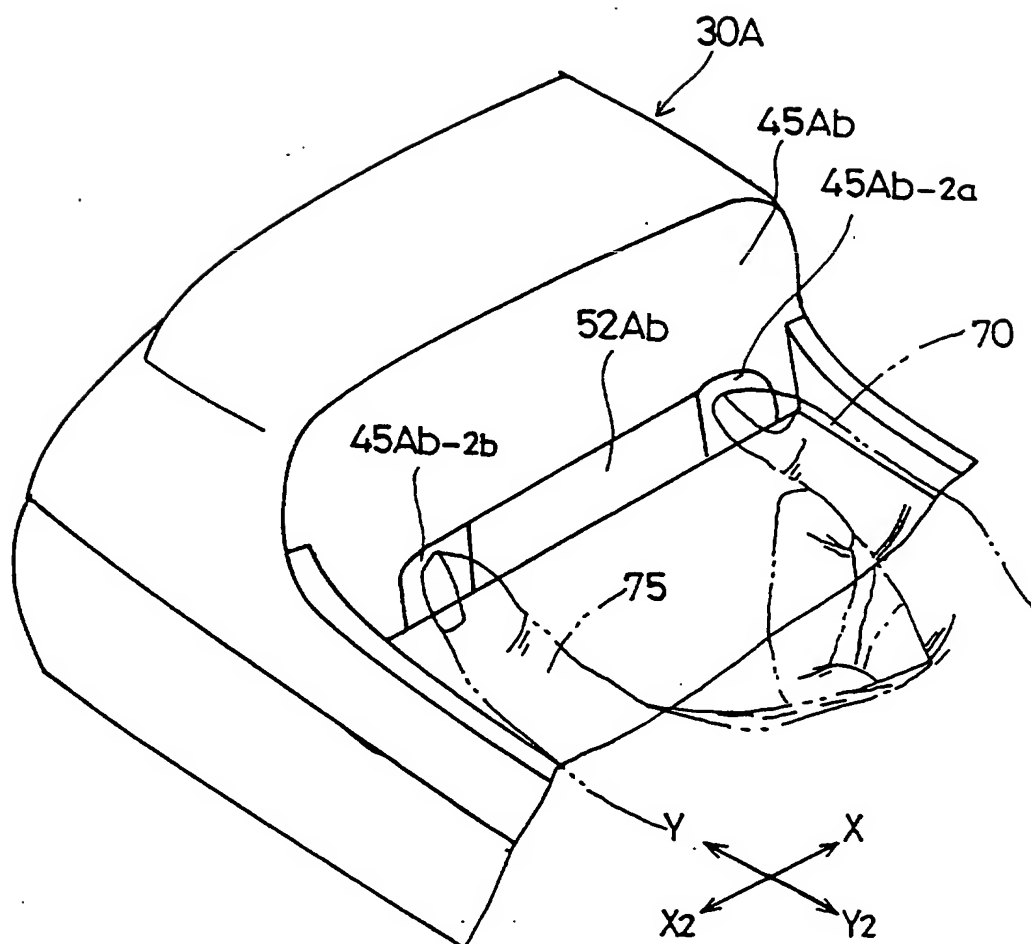


FIG. 13A

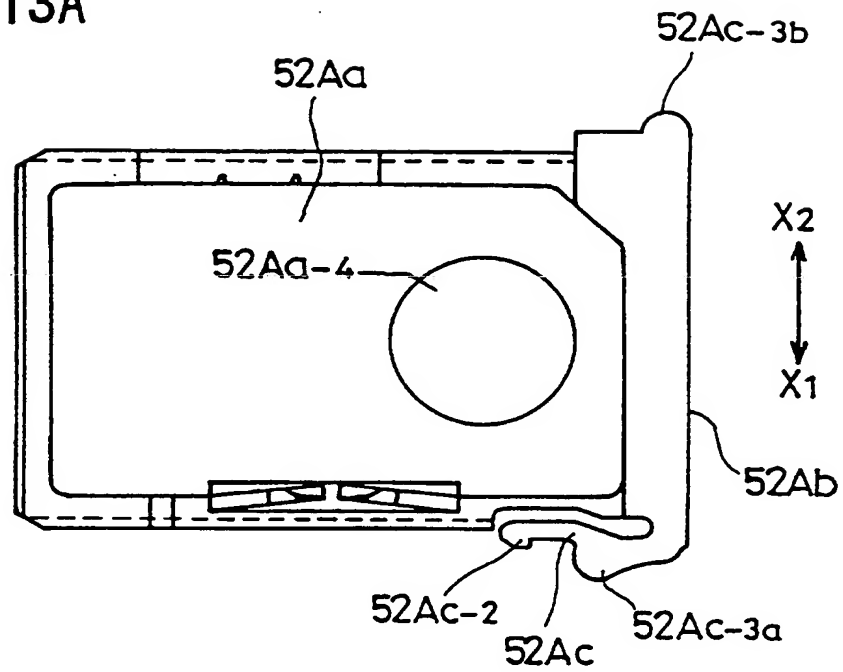


FIG. 13B

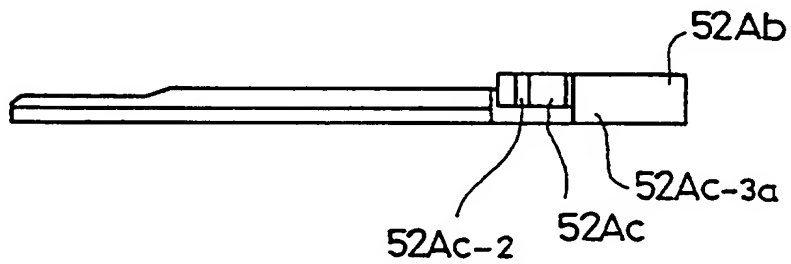


FIG. 14A

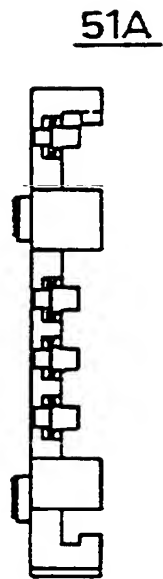


FIG. 14B

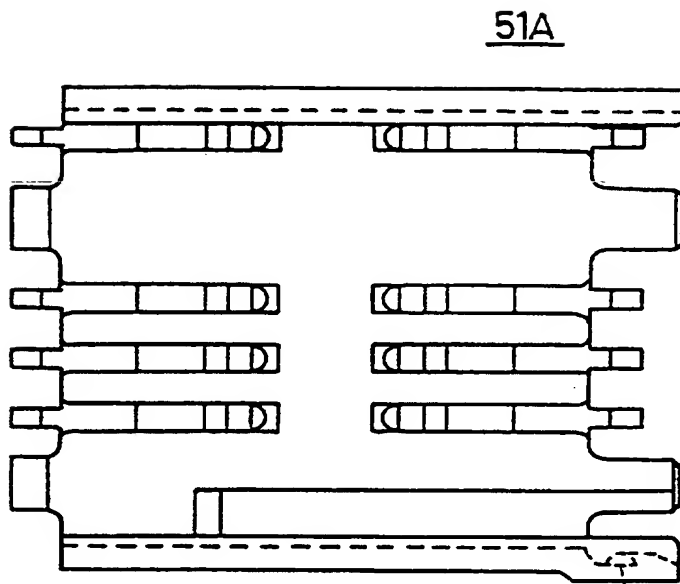


FIG. 14C

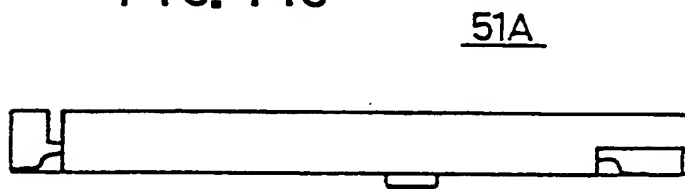


FIG. 15A

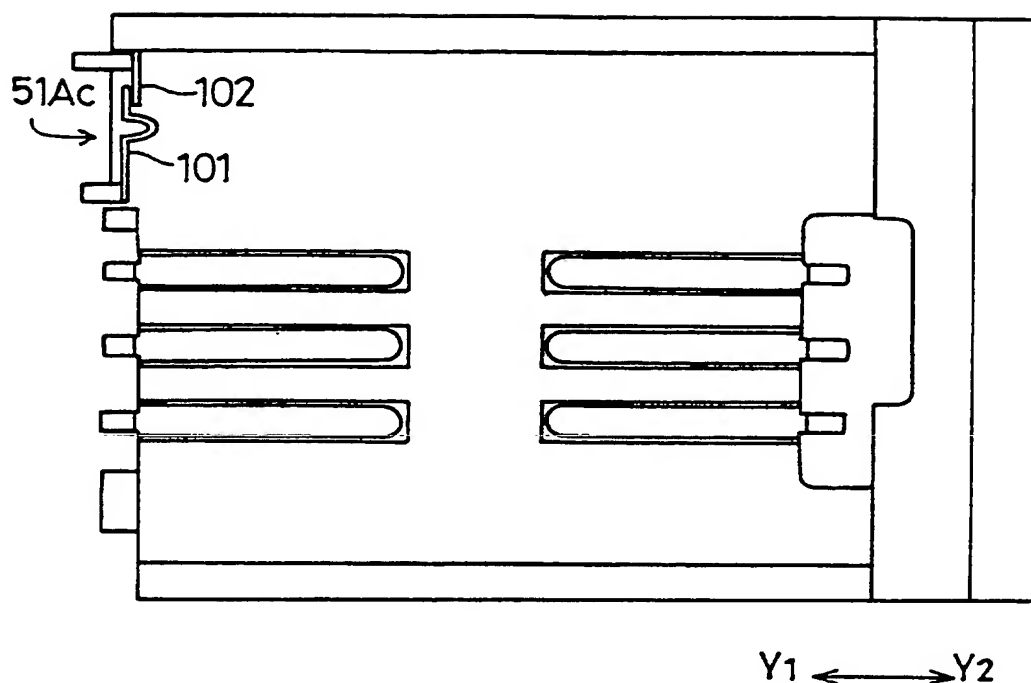


FIG. 15B

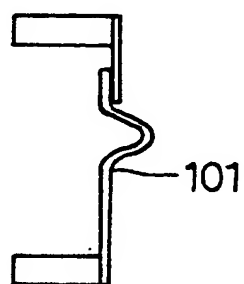
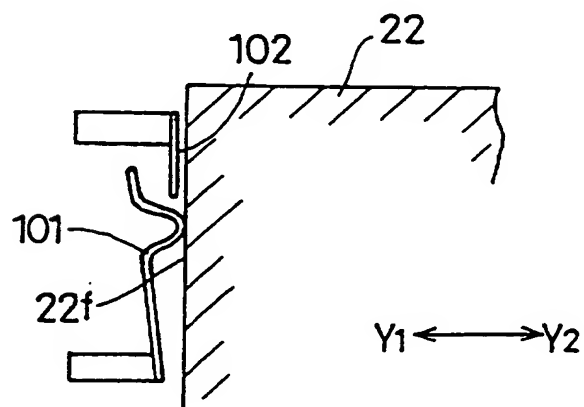


FIG. 15C



1 "PORTABLE TELEPHONE SET"

The present invention relates to portable telephone sets, and more particularly to a portable
5 telephone set suitable for a global system for mobile communication (GSM).

Recently, it has been considered in Japan to employ, as a communication system using portable telephone sets, the GSM which has been employed in
10 Europe. The GSM does not require registration of a telephone number for each portable telephone set. Each individual (subscriber) is assigned to a subscriber identity module in which information concerning the subscriber is stored. If the
15 subscriber exchanges the old portable telephone set by a new one, the subscriber identity module is detached from the old telephone set and is then inserted into the new one. If the rent portable telephone set is used, the subscriber inserts the own subscriber
20 identity module into the set. Thus, the new or rent portable telephone set can be used as the subscriber own portable telephone set.

It has been considered that the subscriber identity module is realized by a compact subscriber
25 identity card in which an integrated circuit including a memory is built. Such a card has a size of, for instance, 25 mm x 15 mm.

The portable telephone set has been required to be thin and have a structure which enables the
30 subscriber identity card to be easily detached therefrom.

There is another card which can be inserted into the portable telephone set. Such a card stores information important to the subscriber, such as
35 subscriber identity information and accounting information. It is not desired to easily detach, from the portable telephone set, the information cards

1 suitable for the portable telephone set as described
above in terms of privacy protection. The portable
telephone set is required to satisfy the above.

5 In the present specification, the cards to
be attached to the portable telephone sets are
referred to as portable telephone information cards.
The portable telephone information cards include the
above subscriber identity card, and another card which
stores information other than the subscriber identity
10 information.

 Figs. 1A and 1B are diagrams of a portable
telephone set 10 for the GSM disclosed in Japanese
Laid-Open Patent Application No. 8-265404. A battery
pack 11 can be attached to the back surface of the
15 portable telephone set 10. A card loading mechanism
12 is provided in a bottom surface portion of a
battery pack mount portion 13 provided to the back
surface of the portable telephone set 10, that is, the
back surface of the mounted battery pack 11. The
20 battery pack mount portion 14 has a bottom plate 14,
in which a rectangular opening 15 is formed.

 The subscriber identity card loading
mechanism 12 is mainly composed of a housing 20 and a
holder 12. The housing 20 is fixed to the inside of
25 the portable telephone set 10, and faces the opening
15. The holder 21 is joined to the housing by a
hinge.

 A subscriber identity card 22 can be mounted
as follows. The holder 21 is rotated and set upright.
30 Then, the subscriber identity card 22 is inserted into
the holder 21, which is then depressed and rotated.
Thus, the card 22 passes through the opening 15 and is
engaged with the housing 20.

 The subscriber identity card 22 can be taken
35 out by the reverse operation. It should be noted that
the subscriber identity card 22 which is mounted
cannot be taken out unless the battery pack 11 is

1 taken out.

The above portable telephone set 10 has the following problems.

5 The battery pack mount portion 13 located in the back surface of the portable telephone set 10 includes a slight recess. A circuit board, a tenkey and other components are tightly provided in a portion 16 opposite to the battery pack mount portion 13. Thus, no space is available in which a new mechanism
10 is provided. The card loading mechanism 12 is provided in the above portion 16, and thus has an increased thickness t1. Hence, the thickness t3 of the portable telephone set 10 is equal to the sum of the thickness t2 necessary to provide the circuit
15 board, the tenkey and other components and the thickness t1 of the card loading mechanism 12. The thickness t3 prevents down-sizing of the portable telephone set 10.

The holder 21 cannot be detached from the
20 housing 20. Hence, it is necessary to take the portable telephone 10 by hand in order to take out the subscriber identity card 22 from the holder 21 and insert the subscriber identity card 22 into the holder 21. The above is troublesome. Further, the card
25 loading mechanism 12 has a complex structure.

A detection switch detects the holder 21 even when the holder 21 having no card is mounted. Hence, if the subscriber dials with no card inserted into the holder 21, the portable telephone set 10
30 starts a corresponding calling procedure although it is not completed.

It is a general object of the present invention to provide a portable telephone set in which the above disadvantages are eliminated.

35 A more specific object of the present invention is to provide a compact portable telephone set having a simplified card loading mechanism.

1 The above objects of the present invention
are achieved by a portable telephone set comprising: a
case having first and second sides opposite to each
other; a group of keys located on the first side of
5 the case; and a card loading mechanism. The case
includes first and second portions located on the
second side. The first portion can accommodate a
battery pack, and the second portion is next to the
first portion and accommodates the card loading
10 mechanism. A card in which information is stored can
be loaded to the card loading mechanism. The card
loading mechanism and the battery pack can be arranged
side by side, so that the thickness of the portable
telephone set can be reduced.

15 The above portable telephone set may be
configured so that: the case has a wall interposed
between the first and second portions; and the wall
has an opening through which the card can be inserted
into the second portion and loaded to the card loading
20 mechanism. Hence, the card cannot be detached unless
the battery pack is detached. Thus, it is possible to
prevent the card from happening to be detached from
the portable telephone set.

 The portable telephone set may be configured
25 so that the second portion includes a protrusion with
respect to a bottom portion of the first portion.
Such a protrusion means that there is a comparatively
large spatial area in the portable telephone set.
Hence, the card loading mechanism can be provided in
30 the second portion without a particular difficulty.

 The portable telephone set may be configured
so that the card loading mechanism comprises: a
housing located in the second portion; and a card
holder having a card accommodating portion in which
35 the card can be accommodated, the card holder having a
spring portion which portion has a handle portion with
which a finger can be engaged, and an engagement claw

1 which can engage with a part of the housing when the
card holder is inserted into the housing. A simple
structure of the card loading mechanism can be
realized.

5 The portable telephone set may be configured
so that the spring portion is formed of a resin.
Thus, the spring portion having a resilient property
can be realized with ease.

10 The portable telephone set may be configured
so that: the spring portion is formed of a resin and
can be resiliently bent in a thickness direction of
the portable telephone set; and the handle portion is
located in a free end of the spring portion. The card
holder can easily be drawn by a single-finger
15 operation.

 The portable telephone set may be configured
so that: the spring portion is formed of a resin and
can be resiliently bent in a thickness direction of
the portable telephone set; the handle portion is
20 located in a free end of the spring portion; and the
card holder has another handle portion located
opposite to the handle portion. The card holder can
easily be drawn by using two fingers such as the thumb
finger and the forefinger.

25 The portable telephone set may be configured
so that: the card holder has a card holding portion
having a spring property and projecting from a side of
the card accommodating portion; and the card holding
portion engages with a part of the card so that the
30 card can be restricted in the second portion. The
card holding portion of the card holder can certainly
hold the card.

 The portable telephone set may be configured
so that the card loading mechanism comprises: a
35 housing located in the second portion; a card holder
having a card accommodating portion in which the card
can be accommodated; and a detection switch which

1 detects a situation in which the card holder with the
card loaded thereto is inserted into the housing.
Hence, even if the card holder with no card
accommodated therein is loaded to the portable
5 telephone set, the portable telephone set can be
prevented from performing a meaningless or wasteful
operation such as a calling procedure.

The portable telephone set may be configured
so that the detection switch has a terminal having a
10 spring property, the terminal which can be engaged
with the card accommodated in the card holder. The
same advantages as described above can be obtained.

The portable telephone set may be configured
so that the card holder has a spring portion which
15 portion has a handle portion with which a finger can
be engaged, and an engagement claw which can engage
with a part of the housing when the card holder is
inserted into the housing. The card holding portion
of the card holder can certainly hold the card.

20 The portable telephone set may be configured
so that the card loading mechanism can receive the
card in a state in which the battery pack is detached
from the first portion. Hence, the card can be
prevented from being drawn in the state in which the
25 battery pack is attached to the portable telephone
set.

Other objects, features and advantages of
the present invention will become more apparent from
the following detailed description when read in
30 conjunction with the accompanying drawings, in which:

Figs. 1A and 1B are diagrams of a
conventional portable telephone set;

Fig. 2A is a partially-cutout plan view of a
portable telephone set according to an embodiment of
35 the present invention;

Fig. 2B is a cross-sectional view of the
portable telephone set shown in Fig. 2A;

1 Fig. 3 is an exploded perspective view of
the portable telephone set shown in Figs. 2A and 2B;

 Fig. 4 is an enlarged perspective view taken
along an arrow III shown in Fig. 2B;

5 Fig. 5 is a perspective view of a subscriber
identity card loading mechanism of the portable
telephone set;

 Fig. 6 is a perspective view of a card
holder of the portable telephone set;

10 Figs. 7A, 7B, 7C, 7D and 7E are diagrams of
the subscriber identity card holding mechanism to
which a card is loaded;

 Figs. 8A and 8B are diagrams of a detection
switch built in the portable telephone set;

15 Fig. 9 is an enlarged perspective view
showing an operation of drawing the card holder from
the portable telephone set;

 Fig. 10 is an enlarged perspective view
showing an operation of loading the card holder

20 Figs. 11A, 11B and 11C show another
subscriber identity loading mechanism;

 Fig. 12 is an enlarged perspective view of a
state in which the subscriber identity card loading
mechanism is installed in the portable telephone set;

25 Figs. 13A and 13B are diagrams of a card
holder;

 Figs. 14A, 14B and 14C are diagrams of a
housing; and

30 Figs. 15A, 15B and 15C are diagrams of
another detection switch.

 Figs. 2A and 2B are diagrams of a portable
telephone set 30 which can be applied to the GSM
according to an embodiment of the present invention.
Further, Fig. 3 is an exploded perspective view of the
35 portable telephone set 30. Fig. 4 is an enlarged
perspective view taken along arrow III shown in Fig.
2B.

1 The portable telephone set 30 has a front
case 32 and a back case 34 between which a printed
wiring board unit 36 is interposed. The whole case of
the portable telephone set 30 includes the cases 32
5 and 34. The front case 32 is equipped with a key
group sheet 31 on which a plurality of keys are
arranged. The back case 34 is equipped with an
antenna 37. The printed wiring board unit 36 is
equipped with a liquid crystal unit 35. The front
10 case 32, the rear case and the printed wiring board
unit 36 are longitudinal in directions Y1 and Y2. A
housing 51, which will be described in detail later,
is attached to the printed wiring board unit 36. The
portable telephone set 30 has a front surface facing
15 in a direction Z1, and a back surface facing in a
direction Z2.

 A plurality of keys 39 are arranged in a
front surface 30a of the portable telephone set 30 so
that the keys 39 occupy an area located in a direction
20 Y2 with respect to the center in the longitudinal
direction. A display window 40 of the liquid crystal
unit 35 and an acoustic output part 41 formed of a
speaker are provided in an area located in a direction
Y1 with respect to the keys 39. An acoustic output
25 part 42 formed of a microphone is provided in the area
located in the direction Y2 with respect to the key
39.

 A battery pack mounting portion 45 is
provided to the back surface 30b of the portable
30 telephone set 30 and is located in the area extending
in the direction Y2 from the center in the
longitudinal direction. In other words, the battery
pack mounting portion 45 is located in the portion
corresponding to the arrangement of the keys 39. A
35 battery pack 46 having a length approximately equal to
half the length of the portable telephone set 30 is
mounted on the battery pack mounting portion 45. The

1 battery pack mounting portion 45 has a recess which
causes the back surface 30b of the portable telephone
set 30 with the battery pack 46 mounted to be a flat
surface. A portion 47, which is adjacent to the
5 battery pack mounting portion 45 in the longitudinal
direction and totally occupies the whole located in
the direction Y1 with respect to the battery pack
mounting portion 45, has a projection projecting from
a bottom surface 45a in the direction Z1.

10 Hereinafter, the portion 47 will be referred to as a
battery pack mount adjacent portion. The interface
between the battery pack mounting portion 45 and the
battery pack adjacent portion 47 is a vertical wall
45b which stands upright in the direction Z1 from the
15 bottom surface 45a. A card holder inserting opening
45-b is formed in a lower end portion of the vertical
wall 45b. The lower side of the vertical wall 45b
corresponds to the position in which the card holder
insertion opening 45-b is formed. Hence, as will be
20 described in detail later with reference to Fig. 10,
when the card holder 52 is placed on the bottom
surface 45a of the battery pack mounting portion 45 of
the portable telephone set 30, the card holder 52
faces the card holder insertion opening 45-b.

25 The portable telephone set 30 has a
subscriber identity card loading mechanism 50, which
is provided in an inner space 47a of the battery pack
mount adjacent portion 47. The mechanism 50 is built
in the portable telephone set 30 without any increase
30 in the thickness thereof because the battery pack
mount adjacent portion 47 projects from the bottom
surface 45a of the battery pack mounting portion 45,
and is located in the area which has a larger spatial
margin than the other area of the portable telephone
35 set 30. Further, the size of the card loading
mechanism 50 itself is small. The thickness of the
portable telephone set 30, which is denoted as t10, is

1 equal to that obtained when the card loading mechanism
50 is not installed.

A description will be given, with reference
to Figs. 5, 6 and 7A through 7E, of the structure of
5 the subscriber identity card loading mechanism 50.

The card loading mechanism 50 includes the
housing 51 and the card holder 52 which holds the
subscriber identity card 22 and is attached to the
housing 51. The card loading mechanism 50 has an
10 upper surface facing in the direction Z1, a lower
surface in the direction Z2, a front surface in the
direction Y2, and a rear portion in the direction Y1.
The width of the mechanism 50 extends in the
directions X1 and X2.

15 As shown in Fig. 6, the subscriber identity
card 22 includes a built-in integrated circuit 22a and
six electrodes 22b provided to the lower surface of
the card 22. Further, the subscriber identity card 22
has a chamfered corder 22c.

20 The card holder 52 is a synthetic resin
molded component, and has a flat shape which is long
in the directions Y1 and Y2. The card holder 52
includes a subscriber identity card accommodating
portion 52a provided to the lower surface side, a
25 front panel portion 52b, and a cantilever plate spring
52c provided to the upper surface side. Further, the
card holder 52 has rail portions 52d and 52e which are
provided to ends thereof located in the directions X1
and X2 and extend in the directions Y1 and Y2.

30 The subscriber identity card accommodating
portion 52a has a size which corresponds to the
subscriber identity card 22, and a depth "a"
corresponding to the thickness t20 of the card 22 so
that the card accommodating portion 52a has a flat
35 recess shape into which the subscriber identity card
can be accommodated. The card accommodating portion
52a includes a slant portion 52a-1, which corresponds

1 to the chamfered corner 22a. Two plate springs 52a-2
and 52a-3 made of synthetic resin are provided to the
end X2 of the card accommodating portion 52a so that
the free ends thereof face each other and are arranged
5 in a line in the directions Y1 and Y2. The plate
springs 52a-2 and 52a-3 can be resiliently bent in the
direction X2. The plate springs 52a-2 and 52a-3
function as subscriber identity card holding portions
having a spring property. Further, holes 52a-4 and
10 52-5 for pushing out the subscriber identity card are
formed in the vicinity of the ends of the bottom of
the card accommodating portion 52a in the direction
Y1.

The front panel portion 52b has a U-shaped
15 cutout portion 52b-1 located at the center thereof.
Protrusions 52b-2 and 52b-3 which protrude in the
direction Z1 are provided on both sides of the U-
shaped cutout portion 52b-1. The U-shaped cutout
portion 52b-1 functions to accommodate a handle
20 portion 52c-3 which will be described in detail later.
The protrusions 52b-2 and 52b-3 come into contact with
a counter U-shaped frame portion 51a-4a which will
also be described later.

The cantilever plate spring 52c is
25 integrally formed when molding the card holder 52, and
is formed so that a portion of the upper surface of
the card holder 52 in the width direction (in the
directions X1 and X2) is cut and raised. The plate
spring 52c has a width W1 that is approximately equal
30 to 1/4 of the width W2 of the card holder 52. The
plate spring 52c has a root portion 52c-1 located in
the center of the card holder 52 in the directions Y1
and Y2. The root portion 52c-1 stands upright by a
distance "b" so that the remaining portion of the
35 plate spring 52c horizontally extends to the front
panel portion 52b in the direction Y2. The cantilever
plate spring 52c has an engagement claw 52c-2 that is

1 located in the center of the upper surface thereof and
projects in the direction Z1. Further, the cantilever
plate spring 52c has the handle portion 52c-3 located
at the end thereof. The engagement claw 52c-2 has a
5 slant surface 52c-2a in the direction Y1, and a
vertical surface 52c-2b in the direction Y2. The
handle portion 52c-3 has a recess portion 52c-3a on
the upper surface oriented in the direction Y1. The
recess portion 52c-3a makes it possible for the end of
10 the forefinger of the hand of the operator to be
easily engaged with the handle 52c-3. Further, the
handle portion 52c-3 is located in the U-shaped cutout
portion 52b-1 of the front panel portion 52b.

When the handle portion 52c-3 is pushed in
15 the direction Z2, the cantilever plate spring 52c is
bent and the engagement claw 52c-2 is thus displaced
in the direction Z2. The cantilever plate spring 52c
is located over the upper surface of the card holder
52 by the distance "b". Hence, even if the spring
20 portion 52c is bent, it is not entered into the
subscriber identity card accommodating portion 52a.

The housing 51 includes a housing main body
51a made of synthetic resin, a plurality of terminals
51b fixed to the housing main body 51a, and a
25 detection switch 51c provided to the housing main body
51a. The housing 51 has a size greater than the card
holder 52.

The housing main body 51a includes a bottom
plate portion 51a-1, sidewall portions 51a-2 and 51a-
30 3, and a counter U-shaped frame portion 51a-4. The
sidewall portions 51a-2 and 51a-3 which are located on
both the sides of the housing main body 51a in the
directions X1 and X2 and extend upwards in the
direction Z1. The counter frame portion 51a-4 are
35 located on both the sides in the direction Y2. Guide
grooves 51a-5 and 51a-6 are formed in the parts of the
sidewall portions 51a-2 and 51a-3 which face the

1 bottom plate portion 51a-1. A guard holder
accommodating portion 51d is formed on the upper
surface side of the bottom plate portion 51a-1. The
guard holder accommodating portion 51d has a flat
5 space partitioned by the sidewall portions 51a-2 and
51a-3. The counter U-shaped frame portion 51a-4 forms
an entrance 51e to the card holder accommodating
portion 51d. Two bosses 51a-1a and 51a-1b for
defining the attachment position of the housing 51 are
10 formed on the lower surface of the bottom plate
portion 51a-1.

The counter U-shaped frame portion 51a-4
includes a central counter U-shaped frame portion 51a-
4a, which is a step portion higher than the frame
15 portion 51a-4. The portion 51a-4a is provided to
allow the cantilever plate spring 52c of the card
holder 52 to pass therethrough. Two upright portions
51a-4b and 51a-4c located on both sides of the frame
portion 51a-4a receive the protrusions 52b-2 and 52b-3
20 when the card holder 52 is inserted. A cut portion
51a-4e having a U shape corresponding to the size of
the engagement claw 52c-2 is formed in an end of the
frame portion 51a-4a extending in the direction Y1.
The frame portion 51a-4d functions as an engagement
25 portion with which the engagement claw 52c-2 is
engaged.

The six terminal members 51b are fixed to
the upper surface 51a-1a of the bottom plate portion
51a-1. Arc-shaped terminal portions 51b-1 are
30 respectively provided on the ends of the six terminal
members 51b so as to correspond to the six electrodes
22b of the subscriber identity card 22. Terminal
portions 51b-2 provided on the other ends of the six
terminal members 51b extend outwards from the ends in
35 the directions Y1 and Y2. The terminal portions 51b-2
have the same height as that of the lower surface 51a-
1b of the bottom plate portion 51a-1.

1 Referring to Fig. 8A additionally, the
detection switch 51c has a first contact member 51c-1
and an L-shaped second contact member 51c-2, and is
normally closed. The first contact member 51c-1 and
5 the second contact member 51c-2 are fixed to the lower
surface 51a-1b of the bottom plate portion 51a-1. The
first contact member 51c-1 has one end located in the
direction Y1, which end is fixed, while the other end
thereof can flexibly be bent. The first contact 51c-1
10 has a convex portion 51c-1a protruding in the
direction Z1. More particularly, the convex portion
51c-1a slightly protrudes from the upper surface 51a-
1a of the bottom plate portion 51a-1 via an opening
window 51a-1c of the bottom plate portion 51a-1. The
15 opening window 51a-1c (the convex portion 51c-1a) is
disposed in a position in which the opening window
51a-1c is pushed by the subscriber identity card 22
held in the card holder 52 when the card holder 52 is
inserted into the housing 51.

20 When the subscriber identity card 22 is not
inserted into the card holder 52, the first contact
member 51c-1 is in contact with the second contact
member 51c-2, as shown in Fig. 8A. Hence, the
detection switch 51c is maintained in the closed
25 state.

As shown in Fig. 3, the printed wiring board
unit 36 has a flexible printed circuit board used to
attach the housing 51 thereto. The flexible printed
circuit board 60 extending from the inside of the
30 printed wiring board unit 36 is folded and adheres to
the upper surface of the unit 36. A plurality of
lands 61 are provided to the flexible printed circuit
board 60 so as to have an arrangement which
corresponds to the terminal portions 51b-2. Holes 62
35 are formed in the upper surface of the unit 36 and the
board 60 so that the positions of the holes 62
correspond to those of the bosses 51a-1a and 51a-1b.

1 The housing 51 is positioned so that the
bosses 51a-1a and 51a-1b are engaged with the holes
62. The terminal portions 51b-2 are soldered to the
lands 61. Then, the housing 51 is mounted on the
5 upper surface of the printed wiring board unit 36 so
that the entrance 51e is oriented along the direction
Y2.

 The housing 51 can completely be
accommodated in the battery pack mount adjacent
10 portion 47, and the entrance 51e faces a card holder
insertion opening 45b-1 of the vertical wall 45b in
the state in which the printed wiring board unit 36 is
covered by the front case 32 and the back case 34.

 As shown in Fig. 4, a finger inserting
15 recess portion 45b-2 is formed in the vertical wall
45b in addition to the card holder insertion opening
45b-1, which opening has a shape corresponding to the
front panel portion 52b of the card holder 52. The
finger inserting recess portion 45b-2 makes it easy
20 for the forefinger of the operator to engage with the
handle portion 52c-3. The finger inserting recess
portion 45b-2 is located just above the card holder
insertion opening 45b-1, and is recessed in the
direction Y1 so that the degree of recess is increased
25 in the direction Z2.

 In the state in which the card holder 52 is
accommodated in the housing 51, as shown in Fig. 4,
the front panel portion 52b is stayed in the card
holder insertion opening 45b-1, and the handle portion
30 52c-3 projects from the lower end of the finger
inserting recess portion 45b-2.

 Next, a description will be given of a
procedure and operation to be carried out when the
operator who rents a portable telephone set inserts
35 his or her own subscriber identity card 22 therein.

 The above procedure is comprised of the
following first to fifth steps. The first step is to

1 detach the battery pack 46 from the portable telephone
set 30. The second step is to take out the card
holder 52 having no card. The third step is to insert
the own subscriber identity card 22 into the card
5 holder 52. The fourth step is to load the card holder
52 with the card 22 inserted therein to the housing
51. The fifth step is to attach the battery pack 46.

The above first to fifth steps will be
described in more detail below.

10 In the first step, the battery pack 46 is
detached from the portable telephone set 30. Hence,
as shown in Fig. 4, the handle portion 52c-3 is
exposed.

In the second step, the card holder 52
15 having no card is drawn and taken out. As shown in
Fig. 9, a forefinger 70 is inserted into the finger
insertion recess portion 45b-2. Then, as indicated by
an arrow 71, the handle portion 52c-3 is pressed in
the direction Z2, and is thereafter drawn in the
20 direction Y2 as indicated as indicated by an arrow 72.
In the operation of pressing the handle portion 52c-3
in the direction Z2, as shown in Fig. 7D, the
cantilever plate spring 52c is bent in the direction
Z2, and the engagement claw 52c-2 is disengaged from
25 the central counter U-shaped frame portion 51a-4a.
Hence, the card holder 52 is released from the locked
state in which it is locked to the housing 51. The
forefinger 70 strongly engages with the recess portion
52c-3a of the handle portion 52c-3. In the subsequent
30 operation, the claw portion 52c-2 passes below the
frame portion 51a-4a, so that the card holder 52 is
drawn to the outside of the housing 51.

As described above, the card holder 52 can
be drawn by the operation of only the forefinger.

35 In the third step, the subscriber identity
card 22 of the operator is inserted in the card holder
52. The card 22 is lightly pushed in the subscriber

1 identity card accommodating portion 52a in the
direction reverse to the direction shown in Fig. 6A so
that the card accommodating portion 52a faces up.
hence, the plate springs 52a-2 and 52a-3 are
5 resiliently bent, so that the card 22 is loaded to the
card holder 52. In this state, the card holder 52 is
detached from the portable telephone set 30. Hence,
it is very easy for the operator to load his or her
own subscriber identity card 22 to the subscriber
10 identity card accommodating portion 52a.

The card 22 can be correctly loaded to the
card holder 52 due to the function of the chamfered
portion 22c of the card 22 and the slant portion 52-1
of the card accommodating portion 52a. The card 22 is
15 pushed in the single direction by the plate springs
52a-2 and 52a-3. Hence, even when the card holder 52
is turned reversely so that the card accommodating
portion 52a faces down, the card 22 does not drop off.

In the fourth step, the card holder 52 is
20 inserted into and loaded to the housing 51.

As shown in Fig. 10, the card holder 52 is
placed on the bottom surface 45a of the battery pack
loading portion 45 of the portable telephone set 30 so
that the card holder 52 faces the card holder
25 insertion opening 45b-1. Then, the card holder 52 is
made to slide in the direction Y1 so that it passes
through the card holder insertion opening 45b-1.
Hence, the card holder 52 is inserted into the housing
51. When the card holder 52 is placed on the bottom
30 surface 45a of the battery pack mounting portion 45,
the card holder 52 faces the card holder insertion
opening 45b-1. This arrangement facilitates the
operation of orienting the card holder 52 toward the
card holder insertion opening 45b-1, so that the card
35 holder 52 can easily be loaded to the housing 51.

The card holder 52 is guided and regulated
in the directions X1, X2, Z1 and Z2 so that the rail

1 portions 52d and 52e engages with the guide grooves
51a-5 and 51a-6 of the housing 51. As shown in Fig.
4, the card holder 52 is inserted until the handle
portion 52c-3 is engaged with the card holder
5 insertion opening 45b-1.

The card holder 52 is prevented from moving
in the direction Z1 because the rail portions 52d and
52e engage with the guide grooves 51a-5 and 51a-6.
The subscriber identity card 22 is prevented from
10 moving in the direction Z1 due to the function of the
card holder 52. Hence, the subscriber identity card
22 cannot move in the direction Z1.

As shown in Fig. 7E, when the engagement
craw 52c-2 comes into contact with the central counter
15 U-shaped frame portion 51a-4a, the slant surface 52c-2
is guided by the frame portion 51a-4a, and the
cantilever plate spring 52c is resiliently bent in the
direction Z2. Hence, the engagement craw 52c-2 enters
below the frame portion 51a-4a. In other words, the
20 card holder 52 can be inserted into the housing 51 by
merely pushing the card holder 52 in the direction Y2
rather than specially depressing the handle portion
52c-3. This also makes it easy to load the card
holder 52 to the housing 51.

25 When the card holder 52 is inserted into the
final position of the housing 51, the engagement craw
52c-2 passes through the central counter U-shaped
frame portion 51a-4a, and the cantilever plate spring
52c is resiliently returned to the original state.
30 Further, the vertical surface 52c-2b of the engagement
craw 52c-2 engages with the frame portion 51a-4a.
Thus, the card holder 52 is locked to the housing 51
and is prevented from being detached therefrom.

When the card holder 52 is inserted into the
35 final position of the housing 51, the six electrodes
22b of the subscriber identity card 22 come into
contact with the six arc-shaped terminal portions 51b-

1 1. As shown in Fig. 8B, the lower surface 22e of the
subscriber identity card pushes down the convex
portion 51c-1a. Hence, the first contact member 51c-1
is detached from the second contact member 51c-2 and
5 the detection switch 51c is opened. Information which
indicates that the subscriber identity card 22 has
been loaded to the card holder 52 is supplied to a
given circuit of the portable telephone set 30. As
has been described previously, the subscriber identity
10 card 22 cannot move in the direction Z1. Hence, the
contacts between the electrodes 22b and the terminal
portions 51b-1 can be definitely established and the
detection switch 51c can be definitely closed.

 In the fifth step, the battery pack 46 is
15 attached to the portable telephone set 30. In this
state, the portable telephone set 30 is switched to a
state in which the owner of the subscriber identity
card 22 can be identified. Since the detection switch
51c is opened, the portable telephone set 30 operates
20 normally. In the state in which the battery pack 46
is attached to the portable telephone set 30, the
handle portion 52c-3 is hidden by the battery pack 46.
Hence, the subscriber identity card 22 cannot be
detached from the portable telephone set 30 in the
25 state in which the battery pack 46 is attached
thereto. As a result, there is no possibility that
the subscriber identity card 22 happens to be detached
from the portable telephone set 30.

 The detection switch 51c is closed in the
30 state in which the card holder 52 with no card is
loaded to the portable telephone set 30, which is not
thus operated. Hence, it is possible to prevent the
occurrence of the wasteful calling procedure which is
encountered in the prior art.

35 The card holder 52 with the card 22 attached
can be detached as described above. As shown in Fig.
7C, the cantilever plate spring 52c is located, by a

1 relatively large distance "c", above the upper surface
of the subscriber identity card 22 loaded to the card
holder 52. Hence, even if the cantilever plate spring
52 is bent downwards, it cannot come into contact with
5 the subscriber identity card 22, and hence the
engagement craw 52c-2 can be certainly detached from
the central counter U-shaped frame portion 51a-4a.
Hence, the subscriber identity card 22 is detached
from the card holder 52, the card 22 is pushed by a
10 tip end of a ballpoint pen or the like, which is
inserted in the hole 52a-4 and/or 52a-5. Hence, the
subscriber identity card 22 can easily be detached.

A description will now be given of another
subscriber identity card loading mechanism 50A by
15 referring to Figs. 11A, 11B, 11C, 12, 13, 14A, 14B and
14C.

The subscriber card loading mechanism 50A
includes a housing 51A and a card holder 52A, which
holds the subscriber identity card 22 and is loaded to
20 the housing 51A. The subscriber card loading
mechanism 50A has a structure in which the card holder
52A has handle portions located on sides X1 and X2.
The other portions of the card loading mechanism 50A
are the same as corresponding those of the card
25 loading mechanism 50.

As shown in Fig. 13A, handle portions 52Ac-
3A and 52Ac-3b are provided on the sides X1 and X2 of
a front panel portion 52Ab. The handle portion 52Ac-
3a is provided to a spring portion 52Ac, which has an
30 engagement craw 52Ac-2 located at the tip end of the
spring portion 52Aa. Further, the spring portion 52Aa
is resiliently bent in the width direction of the
portable telephone set 30A. The card holder 52A is
inserted so that the rail portions are guided by guide
35 grooves of the housing 51A. The engagement craw 52Ac-
2 engages with a recess portion 51Ab of the housing
51A.

1 As shown in Fig. 12, a card holder insertion
opening 45Ab-1 is formed in a vertical wall 45Ab of a
battery pack mounting portion 45A of the portable
telephone set 30A. Further, finger insertion recess
5 portions 45Ab-2a and 45Ab-2b are formed on the sides
X1 and X2 of the card holder insertion opening 45Ab-1.

 A thumb finger 75 is inserted into the
recess portion 45Ab-2b, and the forefinger 70 is
inserted into a finger insertion opening 45Ab-2ba.
10 Then, the handle portions 52Ac-3a and 52Ac-3b are
slightly gripped, and the spring portion 52Ac is bent
so that the engagement claw 52Ac-2 is drawn from the
recess portion 51Ap. In this state, the card holder
52A is drawn in the direction Y2, and is finally
15 detached from the housing 51A. In the above manner,
the card holder 52A can be drawn to the table while
gripping the handle portions 52Ac-3a and 52Ac-3b
without gripping again.

 The operation steps of the subscriber
20 identity card loading mechanism 50A are the same as
those of the mechanism 50, and a description thereof
will be omitted.

 Figs. 15A, 15B and 15C show a variation of
the detection switch 51c. A detection switch 51Ac
25 shown in these figures includes a first contact member
101 and a second contact member 102. As shown in
Figs. 15A and 15B, the detection switch 51Ac is
normally maintained in the closed state, and is
located at an end of the subscriber identity card
30 loading mechanism 50 in the direction Y1. As shown in
Fig. 15C, the detection switch 51Ac is pushed by the
end surface 22f of the subscriber identity card 22
located in the direction Y1 and is thus opened when
the card holder with the card 22 loaded thereto is
35 loaded to the housing.

 The detection switch 51Ac provided in the
end of the mechanism in the direction Y1 is attractive

1 when the subscriber identity card has a large number
of electrodes, for xample, eight electrodes, and a
large number of terminal members is required to be
formed on the bottom of the housing.

5 The above-mentioned embodiments of the
present invention are directed to the use of the
subscriber identity card. However, the present
invention is not limited to the subscriber identity
card, and includes any card in which information is
10 stored.

 The present invention is not limited to the
specifically disclosed embodiments, and variations and
modifications may be made without departing from the
scope of the present invention.

15

20

25

30

35

1 WHAT WE CLAIM IS:

5

1. A portable telephone set comprising:
a case having first and second sides
opposite to each other;
a group of keys located on the first side of
10 the case; and
a card loading mechanism,
the case including first and second portions
located on the second side,
the first portion which can accommodate a
15 battery pack, and the second portion which is next to
the first portion and accommodates the card loading
mechanism,
a card in which information is stored being
loaded to the card loading mechanism.

20

2. The portable telephone set as claimed in
25 claim 1, wherein:
the case has a wall interposed between the
first and second portions; and
the wall has an opening through which the
card can be inserted into the second portion and
30 loaded to the card loading mechanism.

35 3. The portable telephone set as claimed in
claim 1, wherein the second portion includes a
protrusion with respect to a bottom portion of the

1 first portion.

5

4. The portable telephone set as claimed in
claim 1, wherein the card loading mechanism comprises:
a housing located in the second portion; and
a card holder having a card accommodating
10 portion in which the card can be accommodated,
the card holder having a spring portion
which portion has a handle portion with which a finger
can be engaged, and an engagement claw which can
engage with a part of the housing when the card holder
15 is inserted into the housing.

20 5. The portable telephone set as claimed in
claim 4, wherein the spring portion is formed of a
resin.

25

6. The portable telephone set as claimed in
claim 4, wherein:
the spring portion is formed of a resin and
30 can be resiliently bent in a thickness direction of
the portable telephone set; and
the handle portion is located in a free end
of the spring portion.

35

1 7. The portable telephone set as claimed in
claim 4, wherein:

 the spring portion is formed of a resin and
can be resiliently bent in a thickness direction of
5 the portable telephone set;

 the handle portion is located in a free end
of the spring portion; and

 the card holder has another handle portion
located opposite to the handle portion.

10

 8. The portable telephone set as claimed in
15 claim 4, wherein:

 said card holder has a card holding portion
having a spring property and projecting from a side of
the card accommodating portion; and

 the card holding portion engages with a part
20 of the card so that the card can be restricted in the
second portion.

25

 9. The portable telephone set as claimed in
claim 1, wherein the card loading mechanism comprises:

 a housing located in the second portion;

 a card holder having a card accommodating
30 portion in which the card can be accommodated; and

 a detection switch which detects a situation
in which the card holder with the card loaded thereto
is inserted into the housing.

35

1 10. The portable telephone set as claimed
in claim 9, wherein the detection switch has a
terminal having a spring property, said terminal which
5 holder.

10 11. The portable telephone set as claimed
in claim 9, wherein the card holder has a spring
portion which portion has a handle portion with which
a finger can be engaged, and an engagement claw which
15 holder is inserted into the housing.

20 12. The portable telephone set as claimed
in claim 1, wherein the card loading mechanism can
receive the card in a state in which the battery pack
is detached from the first portion.

25

 13. A portable telephone set as
hereinbefore described with reference to and as
30 illustrated in the accompanying drawings except for
Figs. 1A and 1B.

35



Application No: GB 9801728.8
Claims searched: 1-13

Examiner: Catherine Schofield
Date of search: 24 April 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.P): H4J (JK), H4L (LECX)
Int Cl (Ed.6): H04B: 1/034, 1/08, 1/38; H04M: 1/02, 1/72
Other: Online:- WPI, JAPIO, IFIPAT

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X,Y	EP 0684723 A2 (SIEMENS)	X:1,4 Y:9,10
X,Y	WO 96/03810 A1 (SIXTEL) - see particularly fig. 10. and page 12, line 8 - page 13 line 3.	X:At least 1 Y:9,10
X,Y	WO 90/13952 A1 (MOTOROLA)	X:1,2,12 Y:9,10
X,Y	US 5465401 (THOMPSON) - particularly fig. 5	X:1 Y:9,10
Y	US 5331123 (KIMBELL & SCHWARTZ) - see column 7, lines 7 - 33	9,10

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.